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NOTES ON THE EARLY STAGES OF TWO CALIFORNIA GEOMETRIDS

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AETHALOIDA PACKARDARIA

This moth was described by Hulst in 1888, as *Hemerophila packardaria.* He subsequently created two synonyms for the same insect, namely, *Selidosema lachrymosa* (1898, described from Los Angeles County), and *Selidosema homopteroides* (1901, from Oregon).

Aethaloida packardaria was pictured by McDunnough in 1920, on Plate VII, fig. ii of his Cleorini Studies.

In 1937 I published a description and illustration of the mature larva, from an example taken in Bouquet Canyon, Los Angeles County. This year (1962) I was able to obtain eggs and rear the species through to maturity, which will serve to supplement and amplify the former incomplete record.

Eggs were secured June 27 from captive females. *Ceanothus* and *Adenostoma* were supplied to them, and oviposition occurred in clusters on the tips of twigs. It was noted that the bases of the eggs in each cluster pointed outward.

EGG: 0.8 mm. high, x 0.6 mm. at the widest point. The form is subovoid, the base wider and the top tapering to a well rounded and smooth surface, with no discernible micropyle. The base tapers inward at the circumference and bears a circlet of pearl-like protrusions, about 20 in number, enclosing a granular depressed floor.

The surface of the egg above the circlet is finely granular, and does not bear ridges. The color, when first laid, is dull olive-green. Later it becomes darker.

Eggs laid June 27 hatched July 2 and 3, 1962. The illustration (fig. 1A), shows the egg in lateral aspect.

FIRST INSTAR LARVA: Length, 2 mm. Width of a typical body segment approximately 0.15 mm.

Head; width, 0.35 mm. Color, jet black except for a narrow transverse bar on the labrum, which is dull white. The ocelli are black, and the setae white.

The body is predominantly black. The thoracic segments taper from the widest next to the head to the third which grades into the 0.15

mm. wide first abdominal segment. The dorsum is solidly black. Laterally on each segment there is a large subtriangulate white spot on each side, which extends up over the dorso-lateral edge.

The legs are black, as are also the prolegs. There are rows of short white setae, the most prominent of which is in longitudinal alignment above the white spots.

The first instar larva is shown on figure 1B. No attempt has been made to accurately map the setae, but preserved larvae are available for this purpose.

SECOND INSTAR LARVA, observed July 7, '62. Length, 4.5 mm. Body width, 0.4 mm., as is also the head width.

Head, black, as in the first instar.

The body is a dull maroon over the dorsum. The white triangulate spots along the side persist as clumps of round spots in groups of approximately three, close together, or fusing with each other. There is a transverse line of round white dots on the front margin of the first segment.

The venter is dull maroon.

This batch of larvae did not thrive well, probably as a result of too quick drying of the food plant. Mature larvae were later beaten from *Adenostoma* and *Ceanothus,* and were carried through to maturity. My previous published description and illustration of the full grown larvae (1937) does not need to be repeated, but a drawing is here included on figure 1C.

PUPA: Length, 13.5 mm. Greatest width, 3 mm. Color, black on wing cases, thoracic and head portions; red-brown on the abdominal segments, with a darker shading on the segmental junctures, and the cauda.

Two black knobs protrude from the front of the head. The maxillae and antennae reach to the wing margins. The cremaster consists of a knobbed triangulate black element, from which arises a pair of relatively long recurved spikes, and along the sides, three short red-brown recurved hooklets. The spiracles are concolorous with the body, and relatively inconspicuous. The pupa is pictured on figure 1D.

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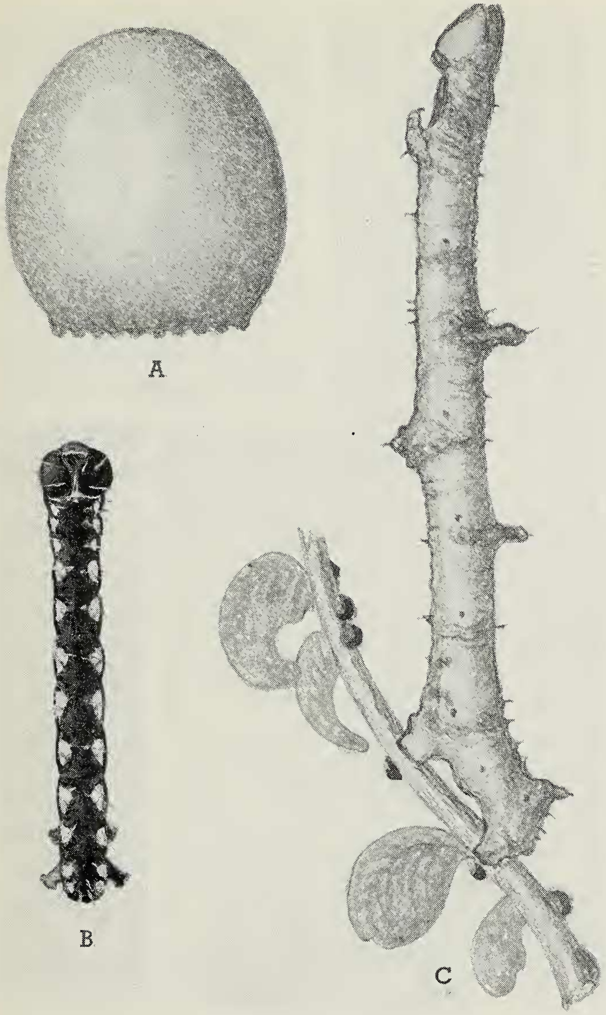

Fig. 1. Early stages of *Aethaloida packardaria* (Hulst). A. Egg, lateral aspect, enlarged × 50. B. First Instar larva, dorsal aspect, enlarged × 30. C. Mature larva, lateral aspect, enlarged × 3. D. Pupa, ventral aspect, enlarged × 5.

Reproduced from water color drawing by the author.

PROCHOERODES FORFICARIA

In 1956 I published notes on the larva and pupa of the geometrid moth, *Prochoeroides forficaria* (Guenée) from larvae obtained in Gila County, Arizona.

Dr. McDunnough's published comments on this species (1940) suggest that the Arizona specimens from which I described the larva and pupa are closer to form *catenulata* Grote, and that this "could very readily be considered a good species."

I have recently reared typical *P. forficaria* from material taken at Del Mar, and the following notes, with illustrations, give a more accurate analysis of the species designated

PROCHOERODES FORFICARIA

Eggs were laid April 10, 1962 in a rearing jar. They were laid on their sides, some singly, others in small bunches.

EGG: When first laid, bright green. Later they became dark, and prior to hatching were black. The form was an elongate oval, with about 16 ridges extending from base to micropyle. There were no horizontal ridges or lines. The micropyle was pitted.

The average length of the egg was 0.9 mm. and the width, 0.5 mm.

There was considerable variation in size and form, some examples being elongate and somewhat less rounded at the ends.

The eggs hatched April 21 and 22, the larvae usually emerging from the side, leaving the remainder of the shell intact.

Not knowing the food plant, the following were tried; lettuce, dandelion, plantain, grass, fuschia, *Ceanothus* and *Cneridium,* none of which proved acceptable. They finally accepted willow.

FIRST INSTAR LARVA: Length, 4. mm. Width, 0.2 mm. Head width, 0.4 mm. The head is relatively large, and is mottled black and brown. Ocelli, black.

The body is cylindrical, elongate, and very narrow. The ground color is slaty gray. There is a broad longitudinal black band on the dorsum, with occasional darker spots on some of the segments. The lower lateral surface is a translucent gray-straw. The entire ventral surface is black. The single pair of prolegs, and anal prolegs, are dark on the lateral surfaces and lighter on the ventral surfaces. The setae are white, and very minute.

The first instar larva is illustrated on figure 2B.

In this phase the larvae were exceedingly active, dropping on a thread when touched.

Larva of 11 mm. in length, — head width, 1.55 mm.

The body is cylindrical, its entire surface being mottled red-brown. on the dorsum there are indefinite quadrate patches of darker brown, more clearly defined in the thoracic and caudal areas, but nowhere connected sufficiently to form an unbroken band. The true legs are yellow-brown, and the prolegs concolorous with the body. The latter are prominent and conspicuous.

MATURE LARVA: Noted on May 5, at the beginning of the final instar. Length of larva, 22 mm. Head width, 2.4 mm.

The body color is light wood brown, the head a shade lighter. The body is mottled with darker spots and dashes, and its surface is crossed transversely by numerous fine creases and ridges.

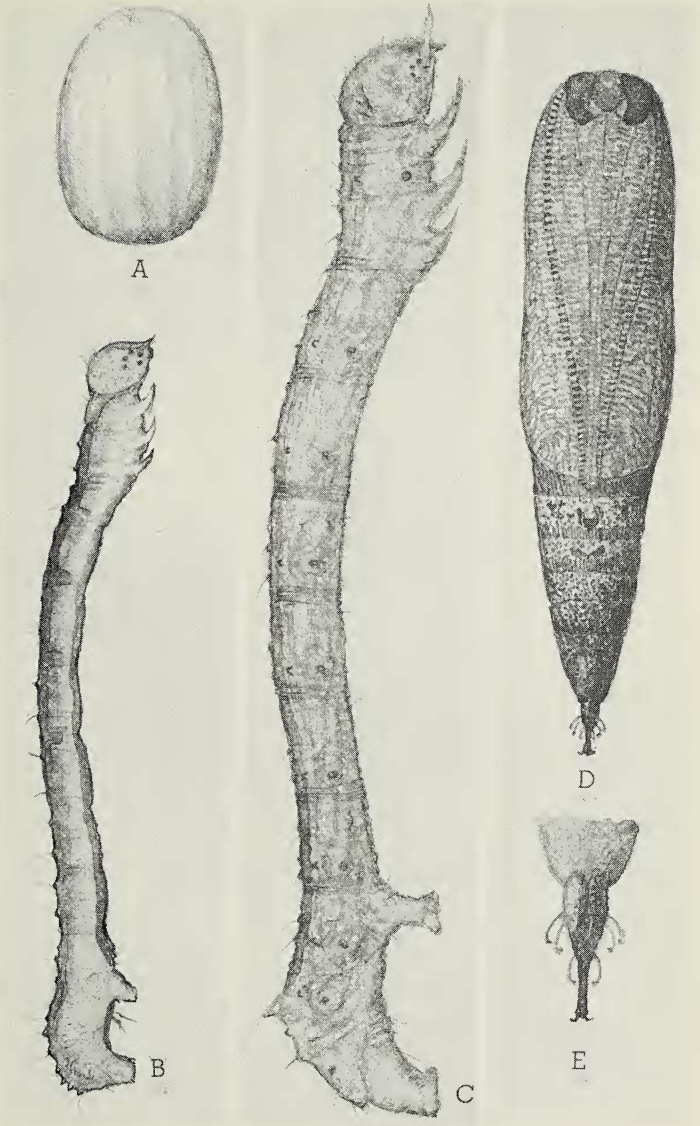

Fig. 2. Egg, larva and pupa of *Prochoerodes forficaria.* A. Egg, lateral aspect, enlarged × 40. B. First instar larva, lateral aspect, enlarged × 24. C. Mature larva, enlarged × 5. D. Pupa, ventral aspect, enlarged × 5. E. Cremaster, highly magnified.

Reproduced from water color drawing by the author.

Middorsally there is an indefinite longitudinal band of brown, nowhere clearly defined. Spiracularly there is a pinkish irregular band, enlarging around each spiracle, and contracting on the segmental junctures. Near each spiracle there are two or three round dots. The legs are slightly translucent, and the prolegs are concolorous with the body, or slightly tinged with yellow.

There are numerous small papillae scattered over the body, two pairs of which in the dorso-caudal area are slightly larger. All papillae bear short yellow-brown setae. This is the larval phase that is pictured on figure 2C.

On May 29, the larva measured 30 mm., the head width being 2.4 mm. as before. The chief difference in this prepupal stage is that there is less definite ornamentation, although the pinkish area following the spiracles is clearly defined, and the spiracles are more conspicuous, with dark rims and a surrounding rim of yellow.

In the final phase the larva becomes sluggish, and spends much time resting on a twig, or the midrib of a leaf, where it is ideally camouflaged. The first example pupated June 9, 1962.

PUPA: Length, 17 mm. Width through middle portion, 5 mm. The color is brown, with the eyes and terminal segments darker.

The antennae extend slightly beyond the wing margins. The wing cases and appendanges are overlaid with fine transverse brown lines and dashes. The dorsal surface, and the abdominal segments are heavily spotted with dark brown and black. The spiracles are concolorous with the body and are inconspicuous.

The cremaster is formed by a double ovoid extension, narrowing down to a clubbed shaft, which ends in two recurved tips that are arched latero-ventrally. Near the base of the shaft there are six small yellow-brown hooklets, three on each side. These arch medially. The pupa is illustrated on figure 2D and an enlarged figure of the cremaster on figure 2E.

The first imago emerged June 21, 1962.

In 1926 Stanley E. Flanders recorded the recovery of three species of parasites from larvae of *Prochoerodes forficaria,* namely, *Amblyteles caeruleus* (Cr.), *A. zebratus* (Cr.), and *Euplectrus* sp.

We have very little information on the range of *P. forficaria* but Dr. McDunnough's description of the southern British Columbia form *combinata* suggests that our typical species ranges northward through Oregon and perhaps Washington, where it grades into *combinata.*

We still need information as to its southern and eastern range.

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